



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

09/942,907

08/31/2001

Tsuneo Ikura

740819-640

8137

22204

7590

07/08/2002

NIXON PEABODY, LLP
8180 GREENSBORO DRIVE
SUITE 800
MCLEAN, VA 22102

EXAMINER

THOMAS, TONIAE M

ART UNIT	PAPER NUMBER
----------	--------------

2822

DATE MAILED: 07/08/2002

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/942,907

Applicant(s)

IKURA

Examiner

Toniae M. Thomas

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 August 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-6 is/are rejected.
- 7) ☒ Claim(s) 2 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. This action is a first Office action on the merits of Application 09/942,907 filed on 31 August 2001. Currently, claims 1-6 are pending.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. *Claims 1 and 3-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jeng (US 5,527,737) in view of Tran (US 5,990,558).*

Jeng discloses a method for fabricating a semiconductor device (figs. 3-8 and accompanying text). The method comprises the following steps: forming a first insulating film 20, with a relatively low dielectric constant and low mechanical strength, on a substrate 10 (fig. 4); patterning the first insulating film through selective etching (fig. 6); forming a second insulating film 18 of silicon dioxide on the substrate (fig. 6); forming first and second interconnect grooves through selective etching using a mask

Art Unit: 2822

pattern formed on the second insulating film (fig. 7 and col. 5, lines 47-50); and forming a buried interconnect in the first interconnect groove (fig. 8 and col. 5, lines 56-58).^{1,2}

Jeng further discloses forming both the first and second insulating films to include inorganic materials as principal constituents. Jeng also discloses forming the first insulating layer to include an organic material as a principal constituent, the second insulating film to include an inorganic material as a principal constituent.³

Jeng lacks anticipation only in not teaching the following limitation: forming a thinned portion of the second insulating layer by polishing the second insulating layer. Tran discloses a method that is compatible with Jeng (fig. 2 and accompanying text). The method comprises the steps of: forming a first insulating film 12, with a relatively low dielectric constant and low mechanical strength, on a substrate 10 (fig. 2); patterning the first insulating film through selective etching (fig. 2 and col. 5, lines 20-30); forming a second insulating film 23, with a relatively high dielectric constant and high mechanical strength, on the substrate (fig. 2 and col. 5, lines 55-61). The second insulating layer is polished to form a thinned portion of the second insulating film (col. 5, lines 58-59).

One having ordinary skill in the art would have been motivated to modify the process of Jeng by forming a thinned portion of the second insulating film, as taught by Tran, because of the following reason: forming a thinned portion of the second

¹ A mask is necessary to form spacers adjacent to the left sidewall of interconnect lines 14a and 14d, and adjacent to the right sidewall of interconnect line 14c.

² Silicon dioxide has a relatively high dielectric constant and high mechanical strength

³ Jeng discloses forming the first insulating layer 20 of both organic (e.g. siloxane) and inorganic (e.g. silicates) materials.

Art Unit: 2822

insulating film provides a more planar substrate topography for subsequently formed layers.

Tran does not teach that the thinned portion of the second insulating film has a thickness of 10nm to 50nm. However, given the general process disclosed in the prior art, it would have been within the ability of one having ordinary skill in the art to discover the claimed range of thickness through routine experimentation. "Where general conditions of [a] claim are disclosed in prior art, it is not inventive to discover optimum or workable ranges by routine experimentation" (see *In re Aller, Lacey, and Hall* 105 USPQ 233 (CCPA 1955)). Therefore, the claimed range of thickness for the thinned portion of the second insulating film is taken to be obvious over the combination of Jeng and Tran.

Allowable Subject Matter

3. Claim 2 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Toniae M. Thomas whose telephone number is (703) 305-7646. The examiner can normally be reached on Monday through Thursday from 8:00 a.m. to 5:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead can be reached on (703) 308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-3432 for regular communications and (703) 305-3432 for After Final communications.

Art Unit: 2822

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JMJ

June 30, 2002

Carl Whitehead, Jr.
CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800